Corbett maths

Surds

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Workout

Question 1: Work out each of the following

(a) $\sqrt{3} \times \sqrt{5}$ (b) $\sqrt{7} \times \sqrt{2}$ (c) $\sqrt{11} \times \sqrt{6}$ (d) $\sqrt{2} \times \sqrt{3}$

(e) $\sqrt{8} \times \sqrt{2}$ (f) $\sqrt{3} \times \sqrt{3}$ (g) $\sqrt{5} \times \sqrt{6}$ (h) $\sqrt{5} \times \sqrt{2}$

(i) $\sqrt{6} \times \sqrt{6}$ (j) $\sqrt{10} \times \sqrt{3}$ (k) $\sqrt{5} \times \sqrt{20}$ (l) $\sqrt{11} \times \sqrt{10}$

(m) $\sqrt{2} \times \sqrt{5} \times \sqrt{3}$ (n) $\sqrt{2} \times \sqrt{6} \times \sqrt{3}$ (o) $\sqrt{10} \times \sqrt{7} \times \sqrt{3}$

(p) $\sqrt{2} \times \sqrt{2} \times \sqrt{2}$ (q) $\sqrt{2} \times \sqrt{3} \times \sqrt{2} \times \sqrt{3}$

Question 2: Work out each of the following

(a) $(\sqrt{3})^2$ (b) $(\sqrt{7})^2$ (c) $(\sqrt{10})^2$ (d) $(\sqrt{5})^2$

Question 3: Work out each of the following

(a) $(\sqrt{2})^3$ (b) $(\sqrt{6})^3$ (c) $(\sqrt{10})^3$ (d) $(\sqrt{3})^3$

(e) $(\sqrt{3})^4$ (f) $(\sqrt{5})^4$ (g) $(\sqrt{10})^4$ (h) $(\sqrt{2})^5$

Question 4: Work out each of the following

(a) $2\sqrt{3} \times 3\sqrt{5}$ (b) $7\sqrt{2} \times 4\sqrt{11}$ (c) $2\sqrt{13} \times 2\sqrt{2}$ (d) $10\sqrt{2} \times 5\sqrt{3}$

(e) $\sqrt{3} \times 6\sqrt{5}$ (f) $2\sqrt{2} \times \sqrt{7}$ (g) $4\sqrt{3} \times 2\sqrt{3}$ (h) $2\sqrt{2} \times 3\sqrt{8}$

(i) $2\sqrt{2} \times \sqrt{5} \times 4\sqrt{3}$ (j) $3\sqrt{2} \times 2\sqrt{6} \times 2\sqrt{3}$

Question 5: Work out each of the following

(a) $\sqrt{10} \div \sqrt{5}$ (b) $\sqrt{21} \div \sqrt{7}$ (c) $\sqrt{30} \div \sqrt{6}$ (d) $\sqrt{8} \div \sqrt{2}$

(e) $\sqrt{80} \div \sqrt{5}$ (f) $\sqrt{56} \div \sqrt{7}$ (g) $\sqrt{15} \div \sqrt{3}$ (h) $\sqrt{72} \div \sqrt{8}$

(i) $\sqrt{7} \div \sqrt{7}$ (j) $\sqrt{26} \div \sqrt{13}$ (k) $\sqrt{48} \div \sqrt{12}$ (l) $\sqrt{48} \div \sqrt{8}$

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Question 6: Work out each of the following

(a) $4\sqrt{6} \div 2\sqrt{2}$ (b) $12\sqrt{10} \div 3\sqrt{5}$ (c) $9\sqrt{15} \div 3\sqrt{3}$ (d) $7\sqrt{30} \div \sqrt{2}$

(e) $20\sqrt{8} \div 5\sqrt{2}$ (f) $40\sqrt{80} \div 20\sqrt{5}$ (g) $51\sqrt{7} \div 3\sqrt{7}$ (h) $36\sqrt{54} \div 18\sqrt{6}$

Question 7: Work out each of the following

(a) $\frac{\sqrt{6}}{\sqrt{3}}$ (b) $\frac{\sqrt{18}}{\sqrt{2}}$ (c) $\frac{15\sqrt{14}}{3\sqrt{2}}$ (d) $\frac{24\sqrt{72}}{3\sqrt{2}}$

Question 8: Simplify the following

(a) $\sqrt{8}$ (b) $\sqrt{75}$ (c) $\sqrt{20}$ (d) $\sqrt{32}$ (e) $\sqrt{48}$ (f) $\sqrt{200}$

(g) $\sqrt{300}$ (h) $\sqrt{80}$ (i) $\sqrt{50}$ (j) $\sqrt{98}$ (k) $\sqrt{63}$ (l) $\sqrt{800}$

(m) $\sqrt{180}$ (n) $\sqrt{220}$ (o) $\sqrt{96}$ (p) $\sqrt{175}$ (q) $\sqrt{1000}$ (r) $\sqrt{60}$

Question 9: Simplify the following

(a) $5\sqrt{8}$ (b) $2\sqrt{20}$ (c) $4\sqrt{50}$ (d) $3\sqrt{98}$ (e) $15\sqrt{32}$ (f) $10\sqrt{75}$

Question 10: Work out each of the following. Simplify each answer.

(a) $\sqrt{6} \times \sqrt{10}$ (b) $\sqrt{15} \times \sqrt{10}$ (c) $\sqrt{30} \times \sqrt{6}$

(d) $\sqrt{22} \times \sqrt{10}$ (e) $3\sqrt{2} \times \sqrt{6}$ (f) $\sqrt{14} \times 4\sqrt{2}$

(g) $4\sqrt{6} \times 3\sqrt{15}$ (h) $2\sqrt{70} \times 3\sqrt{10}$ (i) $5\sqrt{10} \times 2\sqrt{30}$

Question 11: Work out the following additions/subtractions

(a) $\sqrt{8} + \sqrt{18}$ (b) $\sqrt{50} + \sqrt{8}$ (c) $\sqrt{75} + \sqrt{27}$ (d) $\sqrt{200} - \sqrt{32}$

(e) $\sqrt{8} + \sqrt{2} + \sqrt{72}$ (f) $\sqrt{300} - \sqrt{48}$ (g) $\sqrt{1000} + \sqrt{90}$ (h) $\sqrt{28} + \sqrt{63}$

Question 12: Work out the following additions/subtractions

(a) $3\sqrt{8} + \sqrt{2}$ (b) $4\sqrt{27} - \sqrt{75}$ (c) $2\sqrt{50} + 5\sqrt{32}$ (d) $\sqrt{200} - 3\sqrt{18}$

(e) $4\sqrt{80} + 3\sqrt{45}$ (f) $6\sqrt{75} - 2\sqrt{12}$ (g) $10\sqrt{7} + 2\sqrt{175}$

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Question 13: Expand each of the following. Simplify if possible.

(a) $\sqrt{2}(\sqrt{3} + 5)$ (b) $\sqrt{3}(\sqrt{5} + \sqrt{2})$ (c) $\sqrt{6}\,(2 - \sqrt{3})$ (d) $\sqrt{10}\,(5 + \sqrt{10})$

(e) $\sqrt{2}(\sqrt{18} - \sqrt{2})$ (f) $\sqrt{5}\,(3\sqrt{2} - \sqrt{5})$ (g) $2\sqrt{3}\,(3\sqrt{2} + \sqrt{3})$ (h) $4\sqrt{11}(5\sqrt{2} + 2\sqrt{11})$

(i) $\sqrt{27}\,(\sqrt{2} + \sqrt{3})$ (j) $\sqrt{12}\,(7 - \sqrt{3})$

Question 14: Expand each of the following. Simplify if possible.

(a) $(2 + \sqrt{3})(1 + \sqrt{3})$ (b) $(\sqrt{2} + 5)(1 + \sqrt{2})$ (c) $(\sqrt{3} + 1)(\sqrt{3} + 4)$

(d) $(3 + \sqrt{5})(4 - \sqrt{5})$ (e) $(\sqrt{7} - 1)(\sqrt{7} - 1)$ (f) $(5 - \sqrt{3})(5 + \sqrt{3})$

(g) $(3 + \sqrt{2})(1 + \sqrt{3})$ (h) $(\sqrt{12} + \sqrt{3})(\sqrt{3} + 2)$ (i) $(4 - \sqrt{2})(3 + \sqrt{8})$

(j) $(\sqrt{7} + \sqrt{2})(\sqrt{8} + \sqrt{7})$ (k) $(1 + 2\sqrt{2})(2 - \sqrt{2})$ (l) $(3\sqrt{5} + 7)(2\sqrt{5} + 1)$

(m) $(3 + \sqrt{2})^2$ (n) $(1 + \sqrt{5})^2$ (o) $(10 - \sqrt{2})^2$

(p) $(\sqrt{5} + \sqrt{2})^2$ (q) $(2\sqrt{3} - 1)^2$ (r) $(5\sqrt{2} + 3\sqrt{3})^2$

Question 15: Expand each of the following. Simplify if possible.

(a) $(4 + \sqrt{3})(4 - \sqrt{3})$ (b) $(1 - \sqrt{6})(1 + \sqrt{6})$ (c) $(\sqrt{10} + 1)(\sqrt{10} - 1)$

(d) $(\sqrt{7} + \sqrt{5})(\sqrt{7} - \sqrt{5})$ (e) $(2\sqrt{3} - 1)(2\sqrt{3} + 1)$ (f) $(5 - 4\sqrt{3})(5 + 4\sqrt{3})$

Question 16: Rationalise the denominators for each of the following

(a) $\dfrac{2}{\sqrt{3}}$ (b) $\dfrac{5}{\sqrt{2}}$ (c) $\dfrac{7}{\sqrt{6}}$ (d) $\dfrac{1}{\sqrt{10}}$

(e) $\dfrac{4}{\sqrt{2}}$ (f) $\dfrac{9}{\sqrt{6}}$ (g) $\dfrac{\sqrt{2}}{\sqrt{3}}$ (h) $\dfrac{3}{2\sqrt{5}}$

(i) $\dfrac{\sqrt{5}}{\sqrt{80}}$ (j) $\dfrac{5\sqrt{5}}{\sqrt{20}}$ (k) $\dfrac{\sqrt{2} + 1}{\sqrt{5}}$ (l) $\dfrac{2 - \sqrt{3}}{\sqrt{3}}$

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Question 17: Rationalise the denominators for each of the following

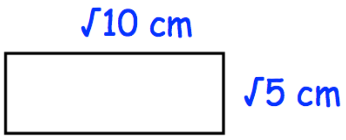
(a) $\frac{6}{3 - \sqrt{2}}$ (b) $\frac{4}{1 + \sqrt{5}}$ (c) $\frac{8}{\sqrt{3} - \sqrt{2}}$ (d) $\frac{\sqrt{2}}{\sqrt{10} + \sqrt{8}}$

(e) $\frac{3\sqrt{6}}{\sqrt{6} - 3}$ (f) $\frac{1}{2\sqrt{3} + \sqrt{5}}$ (g) $\frac{1 + \sqrt{5}}{1 - \sqrt{5}}$ (h) $\frac{\sqrt{11} - \sqrt{3}}{\sqrt{11} + \sqrt{3}}$

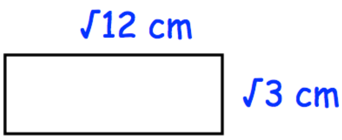
Apply

Question 1: Find the area of each of these rectangles

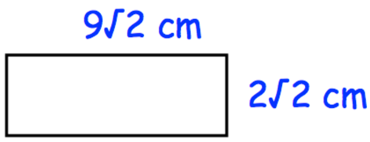
(a)



(b)

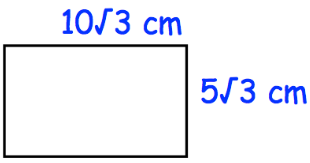


(c)

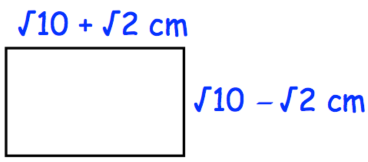


Question 2: Find the perimeter of each of these rectangles

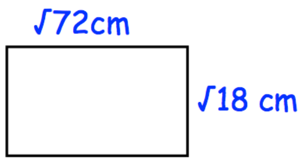
(a)



(b)

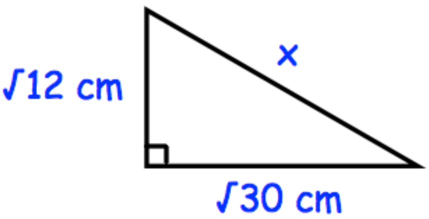


(c)

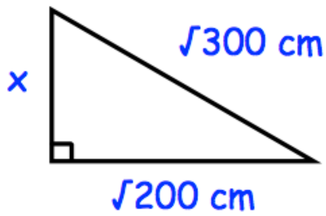


Question 3: Calculate x for each of the following right angled triangles.
Give your answer as a simplified surd (or integer).

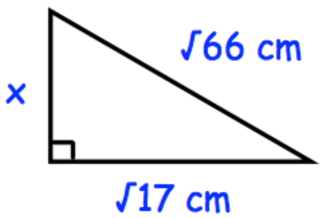
(a)



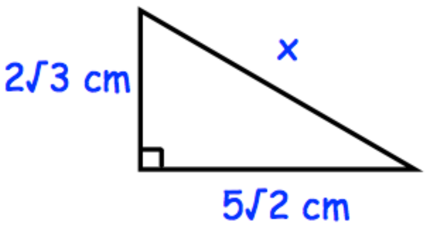
(b)



(c)



(d)



Surds

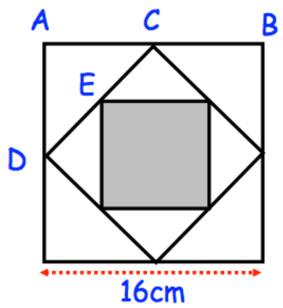
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Question 4: A shed has dimensions, in metres, of height $\sqrt{5}$, width $\sqrt{6}$ and length $\sqrt{10}$
Find the volume of the shed.
Give your answer as a simplified surd.

Question 5: Mrs Jenkins is making decorations for a wedding.
She needs $18\sqrt{5}$ metres of ribbon in total.
Mrs Jenkins has 40 metres of ribbon.
Does she have enough ribbon?



Question 6: The midpoints of the sides of a square of side 16cm are joined to form another square. This process is then repeated to create the shaded square.



Find the area of the shaded square.

Question 7: The area of a rectangle is $\sqrt{125}$ cm^2
The length of the rectangle is $(2 + \sqrt{5})$ cm.
Calculate the width of the rectangle.
Express your answer in the form $a + b\sqrt{5}$, where a and b are integers.

Question 8: The triangle below has an area of $2\sqrt{6}$ cm^2.
Find the height of the triangle, x.
Give your answer as a simplified surd.

